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ABSTRACT

This study was designed to measure anxieties, expectations, achievement levels, and the mastery of research and statistics prior to and after the completion of a research methods course by 109 graduate students (85 female and 24 male). Subjects completed surveys and pretests to measure anxiety, perceptions about research and statistics, and expectations related to research and statistics. Results were consistent with the expectation that subjects reporting a greater breadth of knowledge (self-efficacy) reported less anxiety. At the end of the course, 69.4% of female students reported expectations to learn statistics in comparison with 38.8% before the class. Female students gained enough confidence to conclude that they would be able to understand and use research. No significant relationship was found between anxiety levels and gender. Appendixes contain the course syllabus, reported levels of anxiety, and the pre- and post-questionnaires. (Contains 9 tables and 13 references.) (SLD)

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The Effects of a Graduate Learning Experience on Anxiety, Achievement, and Expectations in Research and Statistics

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of the Northeastern Educational Research Association, New York

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The effects of a graduate learning experience on anxiety, achievement, and expectations in research and statistics

Methods of research courses often elicit graduate students' feelings of inadequacy, stress, and anxiety. These attitudes may result in student apathy to pursuing research because of the Jonah complex (Maslow, 1966), a feeling that they do not have the prerequisite abilities to master the research methodologies. Moreover, graduate students are not realizing their future potential to conduct research and advance themselves in their respective careers.

Students often delay taking statistics and research courses until the end of their graduate studies. These students do not develop abilities to evaluate and comprehend assigned readings during the greater part of their graduate curriculum.

Dillon (1982) created the term, statisticophobia, to represent the anxiety associated with college statistics classes, a phenomenon with important consequences for students' current and future research opportunities. Roberts & Saxe (1982) reported a significant relationship between sex and attitude toward statistics; males were more confident about using and understanding statistics, and their subsequent performances were higher than females. Other researchers (Benson, 1989; Zeidner & Safir, 1989) have reported that females were more anxious about taking statistics courses than males. However, Sutarso (1992) in a multiple variable study of possible impediments to learning statistics, including age and sex, did not find sufficient evidence to establish relationships between undergraduate or graduate students' anxiety in learning statistics with sex.

Kaiser (1992) recognized that students were not motivated to learn statistics and research because they felt that these matters did not relate to their future career goals. Their immediate goals were to complete and pass the research course and move on with their educational program. Due to anxieties to mathematics related courses, these students rationalize that important skills for success are often perceived as abstract reasoning and critical thinking, namely, verbal competencies. Healey (1990) reported that students are

neither predisposed to learning statistics nor cognizant of the relevance of statistics to the better understanding of their particular disciplines. Graduate faculty have the responsibility of helping students understand the relevance of statistics and research methods as prerequisite skills for the furthering of their careers. Graduate faculty could help address the problem by providing appropriate and constructive strategies to enable students to master statistics. Graduate seminars could be used to enable faculty to provide innovative, non-stressful learning environments. The mastery of essential quantitative and qualitative concepts is paramount to the application of good reasoning, scientific method, and the relevance of the above in both the interpretation of research and the ability to make contributions to their fields.

The psychological theories of Bandura (1986 and 1989) and Rotter & Hochreich (1975) should be integrated into a research oriented curriculum, so students develop better self-efficacies and general feelings of positive expectancies to succeed. On the above basis, the investigator studied the effects of a designed research methods curriculum in reducing anxiety to research and statistics by increasing skills. The emphasis included the relevance of these disciplines in furthering careers and applications to improve education.

If students experience a positive feeling from their abilities to master research curriculum and are given positive, constructive feedback from the instructor, their self-efficacies and positive expectations may be increased. Since self-efficacy and expectation are relevant to achievement, future leaders in the field of education would become more proficient and better serve their communities and schools. Students need to redefine their goals in educational research. If the course content redirects their feelings of competencies in learning and using statistical and research methods, then they will realize they have the ability to succeed.

The purpose of the research was designed to measure anxieties, expectations, achievement levels and the mastery of research and statistics prior to and after the

completion of a research methods course. The statistical analyses were designed to assess the relationships among these variables.

Methodology

Methods of Research is a core course to satisfy the requirements for a standard methods course for research and statistics for graduate students. The course combines objectives for the introduction of theory and methods of research, instruction for becoming statistically literate with instruction and application for understanding and interpreting professional research studies. The culminating project for this course is the formulation and development of an action research proposal. A course syllabus is found in Appendix A.

The subjects ranged in age groupings from 20 to 56+. The subjects were attending a university in the Greater New York Metropolitan area. Fourteen different graduate areas were represented. See Appendix B. The sample consisted of 109 graduate students, 85 females and 24 males, who were enrolled in Methods of Research, Fall 1996. The instruments consisted of questionnaires and skill assessments developed by the researcher using feedback from a research professor and author at a university in the Greater New York Metropolitan area. See Appendix C.

The subjects completed surveys and were administered pretests prior to the commencement of instruction during the initial class meeting. The survey was designed to measure the students' self-reports of (a) statistical and research anxiety; (b) perceptions of research and statistical knowledge, and (c) future expectations related to research and statistics. The pretest was used to measure research and statistics knowledge. Surveys and postests were administered during the last class of the semester.

Participating instructors used the same textbook with a companion statistical pamphlet, and administered multiple-choice tests as one tool to assess statistical and research concepts. Students were required to prepare a critical analysis of one published research study and formulate a research project for the grade.

Results, Conclusions, and Educational Implications

The main focus of the research analysis addressed the issues of anxieties and expectancies related to courses in the statistics and research areas. The investigator believed that high levels of anxiety and low self-efficacies were impediments to learning and use of statistics and research, requisite skills needed to (a) evaluate research and (b) become contributors to accummulated knowledge in their disciplines. Contemporary cognitive psychologists (Bandura 1986, 1989; Rotter & Hochreich 1975) have stated that the expectancies of the achievement levels have a great impact on success. The investigator considered that anxiety was a deterrent to both thoughtful work and achievement. If the student expects to fail, failure may become a self-fulfilling prophecy. Thus, the ability to master research and statistics may not be enough.

A summary of the results and conclusions follows. The makeup of the graduate classes were predominately female, a ratio of 85 to 24. There were no significant mean anxiety level differences between the self-report measures by males and females on anxiety levels for (a) pre- and post-test research anxieties and b) pre- and post-test statistical anxieties beyond the .05 level. See Table 1.

Table 1

Means, Standard Deviations and t-Values for Comparisons of Males and Females on Reported Anxiety Levels Associated with Research and Statistics

Variable	Males			Females				
	n	M	SD	n	M	SD	t	p
Prior to Course Anxiety-Research	24	2.29	0.96	85	2.38	0.89	0.41	.68
After Course Anxiety-Research	24	1.96	0.91	85	2.01	0.87	0.26	.91
Prior to Course Anxiety-Statistics	24	2.42	0.93	85	2.79	0.99	1.65	.93
After Course Anxiety-Statistics	24	2.00	0.91	85	2.01	0.87	.26	.74

These results were contraindicative of the findings presented by Roberts & Saxe (1982), Benson (1989) and Zeidner & Safir (1989). However, these results were consistent with Sutarso's (1992) study, as there were no significant differences in anxiety levels between the sexes. Contemporary female graduate students have a much broader horizon for occupational skills than previous generations. They are more likely to select careers that were previously considered male occupations.

The relationships, zero order correlations, between self-reported anxiety levels in research and statistics prior to and after the completion of a methods of research course for age groups and number of graduate credits are presented in Table 2.

There were no significant relationships beyond the .05 level between the age of the graduate students or the number of completed graduate credits with the students' pre- and post-test anxiety levels. See Table 2.

Table 2

Zero Order Correlations between Self-Reported Anxiety Levels in Research and Statistics with Age, and Number of Graduate Credits

	Prior to Course		After Completion of Course	
	Anxiety Research	Anxiety Statistics	Anxiety Research	Anxiety Statistics
Age	.09	.01	.06	.03
Number of Graduate Credits	.02	.10	.10	.06

The zero order correlations between pre- and post test research anxieties, $r(107) = .47$, $p < .001$ and pre- and post-test statistical anxieties, $r(107) = .30$, $p < .001$, were both significant relationships beyond the .05 level. On the above basis, anxiety levels tended to remain stable over the course of the semester. However, these were moderate and low correlations.

The zero order correlation coefficients between self-reported research knowledge with measures of anxiety levels associated with research methods and statistics, age, and number of graduate credits are reported in Table 3. There were significant, low inverse

correlations between the graduate students' self-reported, perceived knowledge of research with reported research anxiety levels prior to the Methods of Research course, $r(107) = -.29$, $p < .01$, and after completion of the Methods of Research course, $r(107) = -.21$, $p < .05$. Greater significant, inverse relationships were noted for the graduate students' perceived knowledge of statistics with reported perceived statistics anxiety levels prior to the Methods of Research course, $r(107) = -.45$, $p < .001$, and after the research methods course, $r(107) = -.23$, $p < .05$.

Table 3

Correlations between Self-Reported Knowledge of Research and Knowledge of Statistics with Anxiety Levels, Age, and Number of Graduate Credits

	Prior Course Anxiety Research	After Course Anxiety Research	Prior Course Anxiety Statistics	After Course Anxiety Statistics	Age	Number of Graduate Credits
Knowledge of Research	-.29**	-.21*	-.09	-.06	-.19*	-.04
Knowledge of Statistics	-.09	-.02	-.45***	-.23*	-.19*	.13

*$p < .05$. **$p < .01$. ***$p < .001$.

From these relationships, it was apparent that there was a greater fear of statistics due to lack of perceived statistical competence prior to the completion of a research methods course than after the research methods course. Furthermore, self-reported

knowledge was negatively correlated with anxiety levels in both academic disciplines. Therefore, the college instructors should realize that increased self-efficacy does result in decreased anxiety. Students who become more confident to succeed should experience less anxiety.

Previous researchers (Roberts and Saxe, 1982; Benson, 1989; Zeidner and Safir, 1989) reported that females may feel less confident than males in their perceived knowledge of research and statistics prior to the research methods course. Therefore, the investigator used two chi square analyses to compare the ratings of males and females on their responses to self-reported knowledge of research and statistics. Since only one female reported a high level of statistics knowledge prior to the course, her response was coded as moderate. Siegel (1956) has suggested collapsing the cells when there were expected frequencies less than 5.

Table 4

Contingency Tables for Self-reported Initial Research and Statistics Knowledge by Sex

A. Research

Research Knowledge	Sex		
	Male	Female	Total
low	5	20	25
moderate	12	58	70
high	7	7	14
	24	85	109

(2) = 7.41, $p < .05$.

B. Statistics

Statistics Knowledge	Sex		
	Male	Female	Total
low	12	55	67
moderate	12	30	42
	24	85	109

(1) = 1.71, $p = .19$

There was a significant relationship between the self-reported knowledge in research and the sex of the college respondent, chi square (2) = 7.41, $p < .05$. See Table 4. The reason for the significant chi square was that there was a greater than chance expectancy for males to report a high previous knowledge of research (n = 7) than expected by chance (3.1). In like manner, fewer females (n = 7) than expected by chance (10.9) reported high previous knowledge of research. Moderate levels of previous knowledge were in the opposite direction, as fewer males (n = 12) than expected by chance (15.4) reported a moderate level of previous knowledge. More females (n = 58) than expected by chance (54.6) reported a moderate level of statistical knowledge. Slightly less males (n = 5) then expected by chance (5.5) reported a low knowledge of research while more females (n = 20) reported a low level of research knowledge than expected by chance (19.5). Therefore, females were more likely to report a moderate level of research knowledge than males. In a like manner, males were more likely to report a higher level of research knowledge than females.

There was no significant relationship beyond the .05 level between the students' previous knowledge of statistics with sex, chi square (1) = 1.71, p = .19. However, a higher proportion of females (n =55, 64.7%) reported a lower previous knowledge of statistics than the males (n = 12, 50%).

Zero-order correlations between levels of reported knowledge in research and statistics with a measure of research and statistics skills developed by the researcher with the input of a research professor are reported. See Table 5. The statistics and research skills were measured on pretests and posttests based on the statistics and research questions (See Appendix C). See Table 5.

Table 5

Zero Order Correlations between Reported Knowledge of Research and Statistics with Pre- and Post-Assessments of these Skills

	Pretest Research	Posttest Research	Pretest Statistics	Posttest Statistics
Knowledge of Research	.05	-.00	-.15	-.07
Knowledge of Statistics	.13	.21*	-.10	-.06

* $p < .05$

There was one low positive correlation significant beyond the .05 level between reported knowledge of statistical methods with the posttest research scores, $r(107) = .21$, $p < .05$. With respect to the above, students who reported more knowledge in statistics tended to have higher mean scores on the post research test. However, this was a low, nonchance relationship. On this basis, self-reported previous knowledge of statistics (self-efficacy) was one factor that should be considered when students begin a statistics course. However, other measures need to be developed to assess students capabilities and self-efficacies prior to taking the course.

In order to determine if there were significant differences between the students levels of understanding in research and statistics, the investigator used 2 x 2 repeated measures ANOVA designs. The repeated measures were the students scores on the pretest and posttest (a) research and (b) statistics questions. The between measure was based on the sex of the respondents. In this manner, the investigator was able to determine if there were significant differences due to (a) the interaction of sex with pretest-posttest measures, (b) significant differences due to sex, and (c) significant

differences on the pretest-posttest measures in relation to (a) research knowledge and (b) statistics knowledge. The means and standard deviations of pretest and posttest measures on a) research and b) statistics by male and female subjects are reported in Table 6.

Table 6

Means and Standard Deviations for Pretest and Posttest Research and Statistics Scores by Male and Female Subjects

Test	Male			Female			Total		
	M	SD	n	M	SD	n	M	SD	n
Pre-research	3.92	1.67	24	3.72	1.22	85	3.76	1.33	109
Post-research	4.71	1.04	24	4.92	.97	84	4.87	.99	108
Pre-statistics	1.21	.93	24	1.51	1.09	85	1.44	1.06	109
Post-statistics	2.13	.99	24	2.45	1.11	84	2.40	1.09	108

The results of the 2 x 2 ANOVA design comparing pretest and posttest scores on research methods by sex are reported in Table 7. There was no significant difference on the measures of sex, $F(1,106) = 0.00$, $p = .99$, or interaction effect, (sex x pretest-posttest), $F(1,106) = 1.55$, $p = .22$. There was, however, a significant difference beyond the .05 level between the pretest and posttest measures, as the subjects had significantly higher research scores on the posttests ($M = 4.87$, $SD = 0.99$) than on the pretest measure of research knowledge ($M = 3.76$, $SD = 1.67$), $F(1,106) = 36.51$, $p < .001$. Therefore, there was a small but significant gain in research knowledge on the posttest measure.

Table 7

A 2 x 2 Repeated Measures ANOVA Design Comparing Pre- and Post-Test Research Measures by Sex

	df	MS	F
Between subjects			
Sex	1	0.00	0.00
subjects within groups	106	1.74	
Within subjects			
B (pre- post-tests)	1	37.11	36.51*
interaction B x sex	1	1.57	1.55
B x subjects within groups	106	1.02	

*$p < .001$

The results of the 2 x 2 ANOVA design comparing pre- and post-test scores on statistics by sex are reported in Table 8. There was no significant difference on the measures of sex, F (1, 106) = 3.14, p = .08, or interaction effect (sex x pretest posttest), F (1,106) = .06, p = .81. There was, however, a significant difference beyond the .05 level between the pre- and post-test measures on statistics as the subjects had significantly higher scores on the posttests (M = 2.40, SD = 1.09) than on the pretest measure of statistical knowledge (M = 1.44, SD = 1.06), F(1,106) = 30.82, $p < .001$. Therefore, there was a small but significant gain in statistical knowledge on the posttest measure.

Table 8

A 2 x 2 Repeated Measures ANOVA Design Comparing Pre- and Post-Test Statistics Measures by Sex

	df	MS	F
Between subjects			
Sex	1	3.58	3.14
subjects within groups	106	1.14	
Within subjects			
B (pre- post-tests)	1	34.29	30.82*
interaction B x sex	1	0.06	0.06
B x subjects within groups	106	1.11	

*$p < .001$

The final analysis was made by evaluating the graduate students' responses to eight expectations prior to and after the research methods course and the primary and secondary expectations reported by the male and female subjects. See Table 9.

In regards to learning about statistics an interesting change in expectations was noted for the female respondents. Initially, 33 (38.8%) of female respondents indicated their expectations were to learn about statistics. At the conclusion of the methods of research course, 59 female subjects (69.4%) reported their expectations of learning more about statistics had been met.

Other positive but less dramatic changes were also noted for women in the areas of a) learning to write a research proposal increased from 74.1% to 88.8 %, (b) understanding and interpretation of professional studies increased from 72.9% to 82.4%,

Table 9

Frequencies and Percents of Expectations of the Methods of Research Course

Expectation	Sex	Prior to Course		After Course		Primary Expectation		Secondary Expectation	
		n	%	n	%	n	%	n	%
1. to become familiar with research methods and theory	male	21	87.5	21	87.5	6	25.0	5	20.8
	female	72	84.7	78	91.8	27	31.8	5	5.9
	total	93	85.3	99	90.8	33	30.3	10	9.2
2. to apply research approaches to other course work	male	19	79.2	15	62.5	3	12.5	6	25.0
	female	57	67.1	60	70.6	7	8.2	18	21.2
	total	76	69.7	75	68.8	10	9.2	24	22.0
3. to learn about statistics	male	10	41.7	10	41.7	1	4.2	1	4.2
	female	33	38.8	59	69.4	3	3.5	6	7.1
	total	43	39.4	69	63.3	4	3.7	7	6.4
4. to learn research methods to advance myself in my career	male	18	75.0	13	54.2	5	20.8	4	16.7
	female	47	55.3	43	50.6	10	11.8	12	14.1
	total	65	59.6	56	51.4	15	13.8	16	14.7
5. to understand and interpret professional studies	male	15	62.5	17	70.8	0	0.0	3	12.5
	female	62	72.9	70	82.4	8	9.4	12	14.1
	total	77	70.6	87	79.8	8	7.3	15	13.8
6. to learn to write a research paper or proposal	male	17	70.8	22	91.7	3	12.5	1	4.2
	female	63	74.1	75	88.2	19	22.4	9	10.6
	total	80	73.4	97	89.0	22	20.2	10	9.2
7. to apply research methods to my major discipline	male	16	66.7	15	62.5	3	12.5	2	8.3
	female	50	58.8	57	67.1	3	3.5	14	16.5
	total	66	60.6	72	66.1	6	5.5	16	14.7
8. to know about statistics so as not to be misled by reports in the media	male	10	41.7	13	54.2	1	4.2	2	8.3
	female	38	44.7	50	58.8	0	0.0	3	3.5
	total	48	44.0	63	57.8	1	0.9	5	4.6

and c) knowledge of statistics to prevent being mislead by media reports increased from 44.7% to 58.8%. The larger increases in expectations, greater than 10%, were reported by female graduate students.

Summary and Future Research Considerations

The results were consistent with the expectation that students reporting a greater breadth of knowledge (self-efficacy) reported less anxiety in the discipline. Therefore, instructors need to help students build their self-confidence in the quantitative areas. Seminars for instructors could be used to this end. Constructive confidence building instructors could change a student's expectations.

At the end of the research course, approximately twice the proportion of female students (69.4%) reported expectations to learn statistics, an increase of 30.6%, when compared to prior expectations of 38.8%. The above finding supported the fact that the self-reports of females were lower in expressed knowledge of statistics than males prior to the methods course. Based on these findings, the female students made enough gains in self-efficacy as expressed by knowledge of research by the end of the course to no longer conclude that they had less confidence than males in understanding and using research.

In future research studies, pre- and post-test assessments of self-reports of male and female self-efficacies, knowledge of research and statistics, need to be measured to determine if sex differences on expressed knowledge change. The investigator found that females reported a higher expectation to study statistics and conduct research; males' expectations to learn about statistics remained constant before and after the course (41.7%). The proportion of males who expressed the expectation to become familiar with research method and theory also remained constant, 87.5%, prior to and after the completion of the methods course. The females has an increase of 7.1% to become familiar with research methods and theory, 84.7% to 91.8%. Therefore, a smaller proportion of females reported a positive expectation to become familiar with research

methods and theory before taking the research course, 84.7%, than males. The expectation for females after the research methods course, 91.8%, were higher than males, 87.5%.

A higher proportion of the graduate students also reported more interest in learning how to write a research proposal and develop competencies to critically review research articles in their disciplines. The increase of 25.6% was due to the fact that 89% of all subjects reported they wished to write a research proposal at the end of the course compared to 73.4% prior to the research methods experience.

No significant relationship between anxiety levels and sex were found. However, females reported a lower self-efficacy in statistical knowledge. Since there are conflicting research data for the above, sex and anxiety levels should be investigated in different educational fields. The investigator plans to continue the research by replicating the study on a subsequent group of students enrolled in the methods of research course. Added insight will be found by incorporating these results in future analyses.

Finally, students did earn a significantly higher score on the research and statistics posttests than the pretests. Therefore, there were positive gains in both expectations and skills due to the research experience.

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Appendix A

Course Syllabus

Department

ELRS Methods of Research ***Dr. Katherine A. Trimarco***

Section _____ ***Office Hours*** _____

Objectives:

1. To introduce the student to the theory and methods of research;
2. To guide the student in the formulation and conduct of a research project;
3. To help the student complete a micro-research project (alternative requirement).

Program: Class time will be devoted to presentation and discussion of topics listed below; small group exercises; demonstrations; AV presentations; student reports; individual and small group conferences.

Requirements:

1. Completion of all reading assignments and chapter exercises;

2. Submission of a detailed proposal (outline) of a research project or the completion of a micro-research project;

First draft due 11/14 Second draft due 12/5 Conferences to be scheduled

3. Critical analysis of one research study (due 10/17).

Evaluation: The final grade will be based upon the quality of the proposal or the micro-research project (weight = 50%), the quality of the analysis of the research study (weight = 20%), the performance on tests (weight = 20%), and the quality of class participation (weight = 10%).

Texts: Lang, G. and Heiss, G.D. (1994). A Practical Guide to Research Methods (5th ed.). Lanham, MD: University Press of America.
Note: Please bring this text to all class

Lang, G. (1993). A Practical Guide to Statistics for Research and Measurement. Upper Montclair, Montclair State University Bookstore.

Session/Date	*Topic*	*Readings*
1 9/5	**I. Orientation and Introduction to Research** A. Course Overview B. The research process	Text, ch. #1
2 9/12	**II. Selection and Formulation of a Research Problem**	Text, ch. #2

Session/Date	*Topic*	*Readings*
	A. Library lecture: sources of information and use of library resources B. Formulation of a research problem	Perusal of library reference materials
3 9/19 4 9/26	**III. Use of Previous Research** A. Criteria for analyzing a research report B. Integration of previous research	Text, ch. #3
5 10/3 6 10/10	**IV. Statistical Analysis and Data Processing** A. Types of research data B. Descriptive statistics C. Inferential statistics	Text, ch. #4 *Statistics pamphlet pp. 1-45* *Statistics pamphlet pp. 46-54*
7 10/17	**V. Measurement in Research** A. Validity B. Reliability C. Response Set	Text, ch. #5
9 10/31 10 11/14	**VI. Types of Research** A. Historical, Documentary, Bibliographical and Construction B. Descriptive Status studies (surveys) Causal-comparative studies Correlational studies Case studies Content analysis C. Experimental	Text, ch. #6 Text, ch. #7 Text, ch. #8
12 12/5 13 12/12	**VII. Methods and Tools of Research** A. Observation B. Rating Scale C. Interview D. Questionnaire E. Tests F. Sociometric measures G. Experimental measures	Text, ch. #9 Text, ch. #10 Text, ch. #11
13 12/12	**VIII. The Research Report** A. Organizing the report B. Interpreting data C. Writing the report	Text, ch. #12

Appendix B

Reported Levels of Anxiety on Research and Statistics by Graduate Majors

Appendix B

Reported Levels of Anxiety on Research and Statistics by Graduate Majors

Graduate Major	Prior to Course Anxiety-Research			After Course Anxiety-Research			Prior to Course Anxiety-Statistics			After Course Anxiety-Statistics		
	n	M	SD	n	M	SD	n	M	SD	n	M	SD
Counseling	47	2.43	0.88	47	2.13	0.74	47	2.70	0.86	47	2.51	0.78
Teaching	11	1.55	0.93	11	1.64	.92	11	2.84	1.04	11	2.18	0.87
Adm & Sup	25	2.40	1.00	25	2.12	1.09	25	2.84	0.99	25	2.56	0.92
Early Child	4	3.00	0.00	4	1.50	0.58	4	3.25	0.96	4	2.00	0.00
Reading	4	2.50	0.58	4	1.75	0.50	4	3.50	0.58	4	2.25	1.26
Env Ed	4	2.25	0.50	4	2.00	0.82	4	3.00	1.15	4	2.50	0.58
Human Res	1	2.00	0.00	1	1.00	0.00	1	3.00	0.00	1	2.00	0.00
Subst Abuse	1	2.00	0.00	1	2.00	0.00	1	4.00	0.00	1	2.00	0.00
Tech Ed	4	2.75	0.50	4	2.00	0.82	4	1.75	0.96	4	1.50	0.58
Special Ed	1	3.00	0.00	1	3.00	0.00	1	4.00	0.00	1	4.00	0.00

Appendix B-continued

Reported Levels of Anxiety on Research and Statistics by Graduate Majors

Graduate Major	Prior to Course Anxiety-Research			After Course Anxiety-Research			Prior to Course Anxiety-Statistics			After Course Anxiety-Statistics		
	n	M	SD	n	M	SD	n	M	SD	n	M	SD
Business Ed	2	2.00	0.00	2	1.50	0.71	2	3.00	1.41	2	2.00	0.00
Economics	1	1.00	0.00	1	1.00	0.00	1	1.00	0.00	1	1.00	0.00
Mathematics	2	3.00	1.41	2	2.50	2.12	2	1.50	0.71	2	3.00	1.41
Crit Thinking	2	3.00	0.00	2	1.50	0.71	2	3.50	0.71	2	2.00	1.41
For Entire Population	109	2.36	0.90	109	2.00	0.87	109	2.71	0.98	109	2.39	0.85

Appendix C

Pre- and Post- Questionnaires

College of Education and Human Services
Department of Educational Foundations

Fall 1996

Dear Student:

We are interested in learning about your research and statistical knowledge as well as your perceptions of research, statistics, and the application of the course ***Methods of Research*** (ELRS) to your academic and career plans.

We are asking you to complete the attached questionnaire which includes: research-statistics questions, background reference information, and questions relative to your understanding and expectations of the ***Methods of Research*** course.

Later in the semester, we will ask you to complete an additional questionnaire.

Please respond to all questions or statements honestly and carefully. All of the information provided to us will be used for a research study to help us understand our students' needs. No grades will be assigned to you for the completion of any of the components of the questionnaire. All responses will be coded ensuring anonymity of all participants. However, we will provide all students an abstract of the study.

We thank you for your participation.

Dr. Katherine A. Trimarco
Assistant Professor

Name _____ ***Code*** _____

Methods of Research ( ). Section _____

Background Information

✓Gender

Male ☐ Female ☐

✓Age Group

less than 20 years ____ 20-30 years ____ 31-45 _____ 46-55 _____ 56+ _____

Majors

Undergraduate _____

Graduate _____

How many graduate credits have you earned as of September 1, 1996? _____

Survey Questions

1. How does this course apply to your academic and career plans?

_____

_____

2. Although this is a core requirement, why are you taking this course at this time and not at another time in your graduate career?

_____

_____

3. Check your anxiety level, if any, of: ***statistics***

No anxiety _____ Slight Anxiety _____Moderate Anxiety _____ High Anxiety _____

Check your anxiety level, if any, of ***research***

No anxiety _____ Slight Anxiety _____Moderate Anxiety _____ High Anxiety _____

Comments?_____

4. Check your level of preparation of knowledge of research and knowledge of statistics.

Knowledge of Research Low ____ Moderate _____ High _____

Knowledge of Statistics Low ____ Moderate _____ High _____

Comments?

_____

5. What are your expectations for this course? Check the items that are important to you. *(Check as many as you wish.)*

____ 1. to become familiar with research methods and theory

____ 2. to apply research approaches to other course work

____ 3. to learn about statistics

____ 4. to learn research methods to advance myself in my career

____ 5. to understand and to interpret professional research studies

____ 6. to learn to write a research paper or proposal

____ 7. to apply research methods to my major discipline

____ 8. to know about statistics so as not to be misled by reports in the media

____ 9. my expectation is _____

Now review the above list and indicate which items represent your primary and secondary expectation.

Primary expectation: No. _____

Secondary expectation: No. _____

Research and Statistics Questions

Select the correct option and place the letter in front of the item number.

_____1. While the semi-interquartile range is used with the median to measure variability, the _____ is used with the mean. (A) range; (B) raw score; (C) standard deviation; (D) mode.

____2. The type of research which solves an immediate problem, and may then be generalized to the whole population, for practical purposes is: (A) action research; (B) education research; (C) basic research; (D) applied research.

____3. To be a good researcher, one needs: (A) the most sophisticated equipment; (B) an open, unbiased, systematic mind; (c) a lot of personal experiences, and reliance on authorities in the field; (D) knowledge of statistics.

____4. In writing the related research section for descriptive and experimental studies it is important to: (A) treat each study separately, enumerating each one; (B) analyze all of the works that have ever been done on that topic; (C) summarize the findings; (D) present a critical review of the studies.

____5. Statistics and the tools needed to compute them should be determined: (A) after doing the study; (B) while completing the research; (C) before starting the research; (D) throughout the whole research process.

____6. When the scores obtained are skewed positively or negatively, the measure of central tendency used is the: (A) mode; (B) z-score; (C) median; (D) mean.

____7. The term used to define a way of answering questions, including such things as giving socially accepted answers, and faking is called: (A) reliability; (B) usable data; (C) response set; (D) evaluating.

____8. When searching for ideas for a research project, it is a good idea to: (A) do what the teacher tells you to do; (B) examine your own interests and observations; (C) replicate another person's study; (D) find the topic with the most research already on it.

____9. Narrowing down a research problem so that it is feasible, is called: (A) limitation; (B) delimitation; (C) feasibility; (D) testing.

____10. A research project should: (A) always be original, never duplicating studies; (B) be important to your profession and interesting to you; (C) have limitations, but no delimitations; (D) solely be completed on the computer.

College of Education and Human Services
Department of Educational Foundations

Fall 1996

Dear Student:

Now that you have completed the ***Methods of Research*** course, we are asking you again to complete a questionnaire.

Please respond to all questions or statements honestly and carefully. All of the information provided to us will be used for a research study to help us understand our students' needs. No grades will be assigned to you for the completion of any of the components of the questionnaire. All responses will be coded ensuring anonymity of all participants. However, we will provide all students with an abstract of the study, if they wish to obtain one.

We thank you for your participation.

Dr. Katherine A. Trimarco
Assistant Professor

Name _____ ***Code*** _____
Last / First

(If you wish to receive a summary of this study, please include your address.)

_____
Street/Avenue City State ZIP

Methods of Research, Section _____

Background Information

✓ Gender
Male Female

✓ Age Group

less than 20 years ____ 20-30 years ____ 31-45 _____ 46-55 _____ 56+ _____

Majors
Undergraduate _____

Graduate _____

How many graduate credits have you earned as of September 1, 1996? _____

Survey Questions

1. Now that you have taken this course, how does this course apply to your academic and career plans?

_____

_____

2. Check your current anxiety level, if any, of: ***statistics***

No anxiety _____ Slight Anxiety _____Moderate Anxiety _____ High Anxiety _____

Check your current anxiety level, if any, of ***research***

No anxiety _____ Slight Anxiety _____Moderate Anxiety _____ High Anxiety _____

Comments?_____

_____

3. Now that you have taken this course, which of the following expectations you had when starting this course, were met?

(Check as many as you wish.)

____ 1. to become familiar with research methods and theory

____ 2. to apply research approaches to other course work

____ 3. to learn about statistics

____ 4. to learn research methods to advance myself in my career

____ 5. to understand and to interpret professional research studies

____ 6. to learn to write a research paper or proposal

____ 7. to apply research methods to my major discipline

____ 8. to know about statistics so as not to be misled by reports in the media

Any comments? _____

4. Research and Statistics Questions

Select the correct option and place the letter in front of the item number.

_____1. While the semi-interquartile range is used with the median to measure variability, the _____ is used with the mean. (A) range; (B) raw score; (C) standard deviation; (D) mode.

_____2. The type of research which solves an immediate problem, and may then be generalized to the whole population, for practical purposes is: (A) action research; (B) education research; (C) basic research; (D) applied research.

____3. To be a good researcher, one needs: (A) the most sophisticated equipment; (B) an open, unbiased, systematic mind; (c) a lot of personal experiences, and reliance on authorities in the field; (D) knowledge of statistics.

____4. In writing the related research section for descriptive and experimental studies it is important to: (A) treat each study separately, enumerating each one; (B) analyze all of the works that have ever been done on that topic; (C) summarize the findings; (D) present a critical review of the studies.

____5. Statistics and the tools needed to compute them should be determined: (A) after doing the study; (B) while completing the research; (C) before starting the research; (D) throughout the whole research process.

____6. When the scores obtained are skewed positively or negatively, the measure of central tendency used is the: (A) mode; (B) z-score; (C) median; (D) mean.

____7. The term used to define a way of answering questions, including such things as giving socially accepted answers, and faking is called: (A) reliability; (B) usable data; (C) response set; (D) evaluating.

____8. When searching for ideas for a research project, it is a good idea to: (A) do what the teacher tells you to do; (B) examine your own interests and observations; (C) replicate another person's study; (D) find the topic with the most research already on it.

____9. Narrowing down a research problem so that it is feasible, is called: (A) limitation; (B) delimitation; (C) feasibility; (D) testing.

____10. A research project should: (A) always be original, never duplicating studies; (B) be important to your profession and interesting to you; (C) have limitations, but no delimitations; (D) solely be completed on the computer.

5. Any suggestions/recommendations for changes?

_____

Thank you and good luck to you!